A Scoring Method of Rorschach Test and Levy Movement Test for Discrimination of Accident Proneness in Motor Driver

A SCORING METHOD OF RORSCHACH TEST AND LEVY MOVEMENT TEST FOR DISCRIMINATION OF ACCIDENT PRONENESS IN MOTOR DRIVER*

By

TETSUHIKO KIKUCHI (菊池哲彦)

(Ibaragi University, Mito)

The Rorschach test and Levy movement test both in shortened form were administrated to 202 motor drivers, including accident group and non-accident group. In accident group the shading and color responses in Rorschach cards and the failed cases in Levy movement cards were more frequent than in non-accident group.

With the purpose of clarifying psychological traits of motor drivers prone to accident and of refining methods for discriminating them, a series of experiments were carried out on motor drivers of Miyagi Bus Company (宮城バス株式会社) formerly called Senpoku Railway and Bus Company (仙北鉄道株式会社) in December every year from 1960 to 1963 (Cf. 2 and 4). The part of personality tests as component of this multiphasic survey consisted of (1) individual testing, a) Rorschach's test, b) Levy Movement test** (2) group testing, a) TSKPI (Tohoku Daigaku Sayngyōshinri Kenkyukai Personality Inventory) and b) FSCT (Frustrative Sentence Completion Test). The present paper is concerned with the results of individual testing. Incidentally, by two group tests we obtained several new informations.

Subjects

Two hundred and two drivers participated as subjects in the individual testing. Ss' job records were examined in detail and on the basis of the data, the coefficient of accident of each S was decided according to the formula described below.

Coefficient of Accident=weighted score of accident frequency + rating score of responsibility grade of accident+rating score of skill and attitude of driving+ratio of dangerousness of the line+undesirable disease for a traffic driver (Cf. 2).

The result of the classification of S's on the basis of coefficient of accident was indicated in Table 1.

The drivers who have been in the service of a bus compamy for less than two years

* This research was performed under the guidance of Prof. S. Kitamura (北村晴朗), Tohoku University, with the co-operation of Dr. K. Maruyama (丸山欣哉), Mr. Y. Nagatsuka (長塚康弘), and Mr. M. Ohyama (大山正博).

** The writer wishes to acknowledge his indebtedness to Dr. D.M. Levy and Dr. F. Schriemer for their generous loan of the Cards.

Table 1. Classification of Subjects.

	Non-Accident Drivers	Middle Class Drivers	Accident-Prone Drivers	Drivers Experienced Less Than 2 Years	Drivers of Trucks and Hired cars	Total
2nd Survey	17	24	9	6	4	60
3rd Survey	23	34	6	8	9	80
4th Survey	18	18	4	13	9	62
Total	58	76	19	27	22	202

in the company and the drivers of trucks and hired cars were excluded from the calculation of the coefficient, because in the case of the former it will be considered that their job records are insufficient for evaluation of their accident proneness, and because the latter differs from the bus driver in motor operation and in the job-ranking in the company.

The drivers belonged to Non-Accident group had records of few or no accidents and moreover they were certified as excellent in techniques and attitude in motor driving by the directors of the company.

Procedure

Every year the tesing lasted for three days and about twenty or twenty-seven drivers were tested a day. The early half of each day was allotted for group testing, (Intelligence test, TSKPI, FSCT, Moral Survey) and the later half for individual testing, (Width Estimation Test, Speed Anticipation Reaction Test, Discriminative Reaction Test of Multiple Performance Type, Rorschach's Test, Levy Movement Cards). Under the time limit four out of ten Rorschach's cards were used, that is, II (only in the fourth survey), III, IV (except the fourth survey), VII, and VIII, and I and VII Levy Movement Cards. The reason of card selection was as follows: in Rorschach cards, II was selected because of the first red colored card, III for the analysis of human movement response, IV because of "Father card", VII "Mother cards," VIII the first colored card; in Levy's card, without any particular reason, the cards I and VII were regarded as those which are the most sharply different in the value of stimulation.

The interview with these cards were performed by the author in the same way as the usual administration of Rorschach test. In the third survey, Ss were unconsciously precipitated to respond owing to the larger number of examinees. Compared with the results of the other sessions, we could observe more Fail's and responses of low form level, though the difference was not significant statistically.

The responses given to Levy's cards were classified according to the Klopfer's criterion of categories as well as those given to Rorschach cards.

Results

The data were analysed by two different methods. One is the formal analysis of

responses. That is, the first responses to each card were classified into classes of three classification categories, location, determinant and content of the response, and we inspected which class would be dominant. The other is the calculation of an index of accident proneness for every individual. We examined whether the index was corresponding to the three groups of subjects. As far as the claculation was based upon the individual configuration of response characteristics, the index might be regarded as a simplified but integrative diagnosis of a driver in question, although the diagnosis of course was restricted to extent of personality.

1. The Analysis of Initial Responses

(*a*) *Tendency of Subjects as a Whole*

(*i*) *The Case of Rorschach's Cards:* The upper havles of Table 2, 3, and 4 indicated the frequency of each class of Rorschach classification categories. As the subjects totaled 202, 808 responses were to be obtained. But there were 85 Fail's,

Table 2. Number of Failure to Repsond and

	n	Fail	R
Rorschach's Cards			
II	62	2(3.2%)	60
III	202	6(2.9%)	196
IV	140	11(7.9%)	129
VII	202	48(23.7%)	154
VIII	202	18(8.9%)	184
Σ	808	85(10.5%)	723
Levy Movement Cards			
I	202	33(16.3%)	169
VII	202	20(9.9%)	182
Σ	404	53(13.1%)	351

Table 3. Classification of Responses to

	M	FM	m	FK	K	k
Rorschach's Cards						
II	7(11.3%)	19(30.7%)				
III	120(59.4%)	2(0.9%)				
IV	2(1.2%)	7(5.0%)				2(1.2%)
VII	14(6.9%)	8(3.9%)	1(0.5%)			1(0.5%)
VIII		51(25.2%)				1(0.5%)
Σ	143(17.7%)	87(10.8%)	1(0.1%)			4(0.5%)
Levy Movement Cards						
I	47(23.2%)	1(0.5%)	8(3.9%)	1(0.5%)	1(0.5%)	1(0.5%)
VII	67(33.2%)	1(0.5%)	13(6.4%)			4(1.9%)
Σ	114(28.2%)	2(0.5%)	21(5.2%)	1(0.2%)	1(0.2%)	5(1.2%)

total number of responses was 723 (Table 3). *Fail's* amounted to 10.5% of the total number of responses. 60 Ss gave a Fail or more, amounting to 29.7% of all the subjects (Table 8). In card VII Fail's were the most frequent. This may have a bearing on the fact that most of the Sex responses were often given in the card. Regarding the *location* almost all the responses was classified into either *W* or *D* and the other scores were very small. Out of 723 responses in total, W responses totaled 343, D's 347, and the others only 31. In cards II, III and IV, W's were dominant and in cards VII and VIII D's were dominant.

Next, when we will enumerate determinants in the order of frequency, F's were the most frequent and amounted to 49% of total responses. M's amounted to 18%, FM's, 11%. The rest were as follows: Shadings 5%, colors 4%, achromatic colors 2%. In card III M's were the most frequent (M's amounted to 60% of responses which were given to the card). In card II and VIII FM's were given most frequently (25~30%). And in the other cards both M's and FM's were given very infrequently. In card II and

Classification of Responses: (1) Locations.

W	D	d	dd	S
40(64.5%)	19(30.7%)		1(1.6%)	
113(55.9%)	77(38.1%)	2(0.9%)	4(1.9%)	
79(56.4%)	39(27.9%)	3(2.1%)	8(5.7%)	
62(30.7%)	81(40.1%)	5(2.5%)	3(1.5%)	3(1.5%)
51(25.2%)	131(64.8%)		2(0.9%)	
345(42.6%)	347(42.9%)	10(1.2%)	18(2.2%)	3(0.4%)
55(27.2%)	104(51.5%)	7(3.5%)	3(1.5%)	
58(28.7%)	119(58.9%)	5(2.5%)		
113(28.0%)	223(55.2%)	12(2.9%)	3(0.7%)	

Each Card: (2) Determinatnts.

Fc	Fc−	c	C′	FC	FC−	CF,C	F	F−
			2(3.2%)				28(45.1%)	4(6.5%)
			1(0.5%)	1(0.5%)		1(0.5%)	62(30.7%)	9(9.4%)
22(15.7%)			11(7.9%)				78(55.7%)	7(5.0%)
13(6.4%)	4(1.9%)	1(0.5%)	5(2.5%)				81(40.1%)	26(12.9%)
1(0.5%)				17(7.9%)	2(0.9%)	15(7.4%)	80(39.4%)	17(7.9%)
36(4.5%)	4(0.5%)	1(0.1%)	19(2.4%)	18(2.2%)	2(0.2%)	16(2.0%)	329(40.7%)	63(7.8%)
4(1.9%)	4(1.9%)	2(0.9%)	6(2.9%)				70(34.6%)	24(11.8%)
4(1.9%)	1(0.5%)	2(0.9%)	3(1.5%)				79(39.1%)	8(3.9%)
8(1.9%)	5(1.2%)	4(0.9%)	9(2.2%)				149(36.9%)	32(7.9%)

Table 4. Classification of Responses

	H	Hd	(H)	(Hd)	A	Ad
Rorschach's Cards						
II	6(9.8%)	1(1.6%)			40(64.5%)	3(4.8%)
III	118(58.4%)	5(2.5%)	11(5.4%)		11(5.4%)	8(3.9%)
IV	1(0.7%)	2(1.2%)	2(1.2%)		67(47.9%)	5(3.6%)
VII	9(4.4%)	5(2.5%)	1(0.5%)		24(11.8%)	16(7.9%)
VIII		3(1.5%)	1(0.5%)	1(0.5%)	115(56.9%)	3(1.5%)
Σ	134(16.6%)	16(2.0%)	15(1.9%)	1(0.1%)	257(31.8%)	35(4.3%)
Levy-Movement Cards						
I	45(22.2%)	5(2.5%)	6(2.9%)		4(1.9%)	17(7.9%)
VII	72(39.6%)	5(2.5%)	2(0.9%)		7(3.5%)	12(5.9%)
Σ	117(29.0%)	10(2.5%)	8(1.9%)		11(2.7%)	29(7.2%)

Table 5. Nunber of Failures to Respond and Responses

	n	Fail	R
Responses to Rorschach's Cards			
Non-Accident	232	24(10.3%)	208
Middle Class	304	35(11.5%)	269
Accident Prone	76	10(13.2%)	66
Less Than 2 Years	108	7(6.5%)	101
Truck & Hired Car	88	9(10.2%)	79
Responses to Levy Movement Cards			
Non-Accident	116	13(11.2%)	103
Middle Class	152	18(11.8%)	134
Accident Prone	38	7(18.4%)	31
Less Than 2 Years	54	8(14.8%)	46
Truck & Hired Car	44	7(15.9%)	37

III color responses scarcely appeared. F+% was 80% in the whole. The F+% calculated as to each card differed from one another. The maximum was 95% in card IV and the minimum was 68% in card VII.

The contents of response were comparatively stereotypic and simple. Although A's were the most frequent in general, in card III H's were dominant and in card VII sorts of contents were multiple and relatively A's were reduced. In card IV A·Obj% was larger than those of the other cards and in cards III and VIII At% was larger.

(*ii*) *In the Case of Levy Movement Cards:* The results of Levy's cards were indicated in the lower halves of Table 2, 3, and 4. Responses were 351 *in total* and there were 53 *Fail's*. The percentage of Fail's seemed to be greater than that of Rorschach's cards. Especially the accident group frequently failed in the first card.

to Each Card: (3) Contents.

(A)	(Ad)	At	Sex	A. Obj	Obj	Pl	Others
		5(8.1%)		1(1.6%)	2(3.2%)		2(3.2%)
3(1.5%)		31(15.3%)			2(0.9%)		7(3.5%)
	3(2.1%)	13(9.3%)		31(22.1%)		3(1.5%)	2(1.2%)
5(2.5%)		13(6.4%)	10(4.9%)	1(0.5%)	15(9.4%)	16(7.9%)	39(19.3%)
2(0.9%)		30(14.8%)	2(0.9%)	3(1.5%)	3(1.5%)	15(7.4%)	6(2.9%)
10(1.2%)	3(0.4%)	92(11.4%)	12(1.5%)	36(4.5%)	22(2.7%)	34(4.2%)	56(6.9%)
	2(0.9%)	21(10.4%)	1(0.5%)	2(0.9%)	19(11.2%)	2(0.9%)	45(22.2%)
	1(0.5%)	39(19.3%)		1(0.5%)	5(2.5%)	6(2.9%)	32(15.8%)
	3(0.7%)	60(14.9%)	1(0.2%)	3(0.7%)	24(5.9%)	8(1.9%)	77(19.1%)

of Each Group Classified into Location Categories.

W	D	d	dd	S
106(45.7%)	94(40.5%)	3(1.3%)	3(1.3%)	2(0.9%)
129(42.4%)	131(43.1%)	3(1.0%)	5(1.6%)	1(0.3%)
30(39.5%)	36(47.5%)			
42(38.9%)	49(45.4%)	2(1.8%)	8(7.4%)	
38(43.2%)	37(42.1%)	2(2.3%)	2(2.3%)	
35(30.2%)	63(54.3%)	4(3.4%)	1(0.9%)	
46(30.3%)	81(53.3%)	5(3.3%)	2(1.3%)	
10(26.3%)	21(55.3%)			
13(24.1%)	30(55.6%)	3(5.6%)		
9(20.5%)	28(63.6%)			

This may be the chief cause of a large percentage of Fail in Levy's cards.

Out of 351 responses in total *W's* amounted to 113 and *D's* 223. No space response was given. In *determinants*, the most frequent ones were also F's. The percentage to the total number of responses was almost on the same level (47%) with that of Rorschach's card. The other determinants were very infrequent except M's (28%). The third was m's (5%). FM's were scarcely given. F+% was 79%. For the first card F+ was 65.7% and this low percentage seems to correspond to the fact Fail's were more frequent than in the case of the second card. As to *content* categories, H tended to increase more than in Rorschach's cards with the increase tendency of M. On the other hand, At, Obj and Others (Miscellaneous) tended to augument slightly as compared with the case of Rorschach's cards. Catgeories of A, A·Obj, Sex and Pl seemed to

Table 6. Responses of Each Groups

	M	FM	m	FK	K	k
Responses to Rorschach's Cards						
Non-Accient	41(17.7%)	24(10.3%)				1(0.4%)
Middle Class	54(17.7%)	35(11.5%)	1(0.3%)			2(0.7%)
Accident Prone	15(19.7%)	7(9.2%)				
Less Than 2 Years	20(18.5%)	12(11.1%)				1(0.9%)
Truck & Hired Car	13(14.8%)	9(10.2%)				
Responses to Levy-Movement Cards						
Non-Accident	43(37.1%)		3(2.6%)			1(0.9%)
Middle Class	33(21.7%)	1(0.6%)	6(3.9%)	1(0.6%)		3(1.9%)
Accident Prone	14(36.8%)	1(2.6%)	2(5.3%)		1(2.6%)	1(2.6%)
Less Than 2 Years	11(20.4%)		5(9.3%)			
Truck & Hired Car	12(27.3%)		5(11.4%)			

Table 7. Responses of Each Groups

	H	Hd	(H)	(Hd)	A	Ad
Responses to Rorschach's cards						
Non-Accident	38(16.4%)	3(1.3%)	4(1.7%)		76(32.8%)	8(3.5%)
Middle Class	46(15.1%)	8(2.6%)	8(2.6%)		95(31.3%)	15(4.9%)
Accident Prone	13(17.1%)		3(3.9%)		23(30.3%)	2(2.6%)
Less Than 2 Years	21(19.4%)	5(4.6%)			35(32.4%)	8(7.4%)
Truck & Hired Car	16(18.2%)			1(1.1%)	28(31.8%)	2(2.3%)
Responses to Levy-Movement Cards						
Non-Accident	42(36.2%)	4(3.4%)	4(3.4%)		3(2.6%)	10(8.6%)
Middle Class	33(21.7%)	5(3.3%)	3(1.9%)		6(3.9%)	11(7.2%)
Accident Prone	15(39.5%)		1(2.6%)		2(5.3%)	2(5.3%)
Less Than 2 Years	12(22.2%)	1(1.9%)				6(11.1%)
Truck & Hired Car	15(34.1%)					

diminish in contrast to those of Rorschach's cards.

(*b*) *The Features of Each Group*

The tendency observed in our Ss as a whole was described above. If we search for an averaged image of personality of our subjects from the data above, it can be considered to approximate the so called normal personality, but slightly low in intelligence, not rich in creative thinking, and the level of its objective sensitivity will be rather low and rigid in thinking and in feeling. Its interest and concerns will be nearly stereotypic and not richly colored by an individual's uniqueness. Their experiences may be almost

Classified into Determinant Categories.

Fc	Fc−	c	C'	FC	FC−	CF,C	F	F−
7(3.0%)	1(0.4%)		7(3.0%)	3(1.3%)		3(1.3%)	105(45.3%)	16(6.9%)
14(4.6%)	1(0.3%)		9(3.0%)	5(1.6%)		6(1.9%)	117(38.5%)	25(8.2%)
6(7.9%)		1(1.3%)		3(3.9%)		3(3.9%)	27(35.5%)	4(5.3%)
6(5.6%)	1(0.9%)		1(0.9%)	4(3.7%)	1(0.9%)	2(1.8%)	41(37.9%)	12(11.1%)
3(3.4%)	1(1.1%)		2(2.3%)	3(3.4%)	1(1.1%)	2(2.3%)	39(44.3%)	6(6.8%)
2(1.7%)	1(0.9%)		4(3.4%)				42(36.2%)	7(6.0%)
4(2.6%)	1(0.6%)	3(1.9%)	1(0.6%)				33(21.7%)	16(10.5%)
	1(2.6%)						15(39.5%)	1(2.6%)
1(1.9%)	1(1.9%)	1(1.9%)	1(1.9%)				12(22(2%)	7(12.9%)
1(2.3%)	1(2.3%)		3(6.8%)				15(34.1%)	1(2.3%)

into Classified into Content Coategories.

(A)	(Ad)	At	Sex	A·Obj	Obj	Pl	Others
3(1.3%)	1(0.4%)	31(13.4%)	3(1.3%)	9(3.9%)	6(2.3%)	11(4.7%)	15(6.5%)
5(1.6%)	2(0.7%)	33(10.9%)	5(1.6%)	10(3.3%)	8(2.6%)	12(3.9%)	22(7.2%)
1(1.3%)		7(9.2%)	2(2.6%)	4(5.3%)	1(1.3%)	3(3.9%)	7(9.2%)
1(0.9%)		13(12.0%)	1(0.9%)	5(4.6%)	3(2.8%)	4(3.7%)	5(4.6%)
		8(9.1%)	1(1.1%)	8(9.1%)	4(4.5%)	4(4.5%)	7(7.9%)
		17(14.7%)			5(4.3%)	1(0.9%)	17(14.7%)
	3(1.9%)	24(15.8%)	1(0.6%)	3(1.9%)	12(7.9%)	3(1.9%)	30(19.7%)
		6(15.8%)					5(13.1%)
		7(12.9%)			3(5.6%)	2(3.7%)	15(27.8%)
		6(13.6%)			4(9.1%)	2(4.5%)	10(22.7%)

the same, too. When the group, that showed such an average configuration of personality traits, will be divided into three subgroups, Non-Accident, Middle-Class, and Accident group. What are the characteristics of each subgroups?

At first, let's examine in what manner the difference in psychological characteristics of groups was shown in the frequency of classification categories. The results were shown in Table 5, 6, and 7. Examining the tables, we can see there is no marked difference in frequency of classifications between the groups. We could observe merely the tendency that the accident group had more Fail's, more Fc+cF+c and more FC+CF+C.

Table 8. Number and Percentage of Subjects

	M=0 in Rorschach's	FM=0 in Rorschach's	Fc+cF+c=0 in Rorschach's
Non-accident	23(39.6%)	37(63.7%)	51(87.9%)
Middle Class	26(34.2%)	47(61.8%)	60(78.9%)
Accident Prone	7(36.8%)	12(63.1%)	12(63.2%)
Less Than 2 Years	8(29.6%)	17(62.9%)	20(74.1%)
Truck & Hired Car	10(45.4%)	13(59.1%)	17(77.2%)
Value of χ^2 btw Non-acc. & Acc. Pr.	—	—	5.904
p.	—	—	>0.02

Now, as to the scores which differed in different groups, we took acount of Ss who had or had not these scores and calculate their percentage to their own groups. The results were shown in Table 8. From these results we could say that in accident group were significantly more drivers who (1) had one or more shading responses, (2) had one or more color responses and (3) had one or more Fail's in Levy movement cards, than in no-accident group.

2. *Results of the Index of Accident Proneness (IAP)*

From the viewpoint of the aim of our investigation it may be considered wise to examine whether the configuration of characteristics of responses given by subjects in question will be identified or not with that of the "typical" accident-prone driver, which was assumed on the basis of empirical and theoretical consideration. Thus, we assumed the features of response of accident-prone drivers as follows. And it was established to give points according to the following list if these features were found in each subject. The total of these scores will be called an index of accident proneness (IAP).

List 1. The Features of Reponses Which Were Ascribed to Accident Proneness in Motor Driving and Allotted Scores.

Features of Responses	Scoring Criterion	Point
(1) Fail is observed in Levy Movement Cards.	Per a single Fail.	1
(2) Shadings is scored in Rorschach's Cards.	One or more shading responses.	2
(3) Form level is low.	Either two F−, or two F± or F± and F− or more.	1
(4) Undifferentiated chromatic and achromatic responses is frequent.	One or more of FC−, FC'−, CF, C'F, C, or C'.	1
(5) Undifferentiated m or k is found.	One or more of m or k.	1
(6) No M is found in both Rorschach's and Levy's Cards.	M=O.	1
(7) Initial response time is long.	If one of T/1R is 30 sec. or more.	0.5
(8) The di, de or Piotrowskis' Do is found.	Per one of three kinds.	0.5
(9) Piotrowski's Imp. and Plx., Minkowska' Relation, "Confabularive responses," and narration of one's own Feellings and Experiences.	Per one sort of score.	0.5

Gained Score through Criterion Indicated Below.

FC+CF+C=0 in Rorschach's	Fail≧1 in Rorschach's	Fail≧1 in Levy-M.C.	M=0 in Levy-M.C.
52(89.6%)	17(29.3%)	7(12.1%)	27(46.6%)
65(85.5%)	23(30.2%)	9(11.8%)	48(82.7%)
14(73.6%)	9(47.4%)	7(36.8%)	10(52.6%)
20(74.1%)	5(18.5%)	7(25.9%)	19(70.3%)
16(72.7%)	6(27.3%)	2(9.1%)	11(50.0%)
2.914	2.087	5.904	—
>0.10	>0.20	>0.02	—

Table 9. Frequency of IAP in Rorschach and Levy Movement Cards.

	Non-Accident Drivers	Middle-Class Drivers	Accident-Prone Drivers	Total
0-1.0	32(55.2%)	34(44.7%)	6(31.6%)	72(47.1%)
1.5-2.5	20(34.5%)	29(38.2%)	6(31.6%)	55(35.9%)
3.0-4.0	5(8.6%)	10(13.2%)	6(31.6%)	21(13.7%)
4.5-5.5	1(1.7%)	3(3.9%)	1(5.3%)	5(3.3%)
Total	58	76	19	153
Mean	1.57	1.76	2.11	1.71
SD	0.72	0.82	0.91	0.78

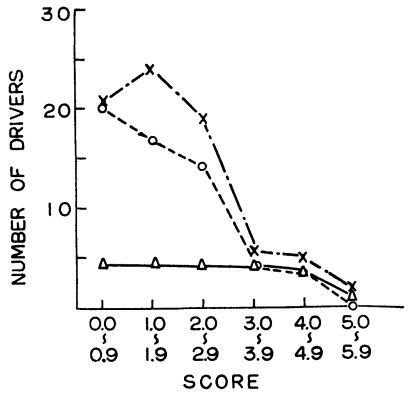

Fig. 1. Distribution of IAP.

Table 9 and Fig. 1 indicate distributions of IAP's of three groups. The average value of IAP of total subjects was 1.71. The mean of non-accident group was 1.57 and that of accident group was 2.11. The distributions of the two groups did not differ significantly by F test, and the means differed significantly on below 0.1% level by t test. The mode of non-accident group was 0.45, that of middle-class 1.45 and that of accident group 2.45.

The distributions of two groups, Non-accident and Accident, however, were not entirely the same. In accident group, almost the same number of Ss was allocated to every class of score and the distribution curve was almost flat. On the contrary, on the curve of the non-accident group, subjects aggregated densely in the range of small score and Ss who scored 3.0 or more points were only 10% or so. The curve of the middle class run along almost the same line to that of non-accident group, though it goes a little to the right side.

Next, if we utilize IAP as screening method of drivers, it will be decided that a score of more than 3.0 is a disqualified score and a socre of less than 2.9 is a qualified score. When we classified Ss into qualified and disqualified groups, we could find more non-accident drivers in qualified group and accident-prone drivers in disqualified group. This associative tendency was significant by chi-square test. ($x^2=6.77$ $p<0.01$) The efficiency ratio of this case was 76.6%.

Discussion

So far as the author knows, there has been no research using Levy Movement Cards for detection of personality traits of accident prone drivers. The present paper as the first appraoch, has been ended in fruitless effort. This unsuccessful result may be brought forth by an inadequate method of response classification. It was only a significant result that Fail's in the performance of the test were more frequent in accident group. And the failures in response to the first card tended to be more frequent than those to the second. This cannot be caused by the difficulty of the first card in responding — because it is the most easy one to respond in the series of the cards — but may yield from the difficulty of shifting the mental set of the accident group from Rorschach situation to Levy movement situation. This is, of course, a sort of rigidity which means the poverty of control function of subjective self, and is not concerned with the activity level of psychological agency. Therefore, this phenomenon can equally happen in both cases of high energy and of low intelligence. Such a tendency of accident prone drivers was discussed already from another view point by Nagatsuka and Kitamura (4, p. 31).

Rorschach's test was also scarcely used for investigation of the purpose with which the present article is concerned. It is perhaps an impedent factor that its administration and analysis are complicated and need much time. Harris used multiple choice form which was made simpler than the rutine one, but he did not get a significant result(1). Miller gave the test in routine administration of complete series to 50 drivers of bus and tram (her non-accident group consisted of 25 drivers and of the same number of accident group). But she did not obtain a significant result, either by factor and pattern study nor the study of integrative diagnosis(3). With the same administrative way, Watanabe gave Rorschach's test to taxi drivers and also found a negative result. Though a statistically significant difference was not demonstrated, she took notice of a tendency that accident prone drivers made more Fail's.(5) This

result approximates ours. Besides she described that the total score of (M+FM+m) in accident-prone drivers was smaller than that of non-accident group. But, in our research such a tendency was not found.

In our data of Rorschach's cards, it was seen that shading responses and color responses were more frequently given by the accident group, and also Fail's tended to be made more frequently by the same group, too. It is not yet distinct what traits of accident-prone drivers are related to the tendency. But, considering the relations of the tendency to that shown by the total subjects, to give more frequent shading responses for accident-prone drivers reflects, according to our interpretation, their delicacy, and they may be not so well controled, and they have tendency to be highly influenced by endogenic emotional stimuli as affection. The fact that we could find more drivers who gave color esp. undifferentiated color responses in accident group was interpreted to indicate that they had weak ego and were apt to be influenced by exogenic emotional stimuli. And the tendency that the accident-prone drivers made more failures, suggested their weakness in decision-making and their poor selective agency of psychological functionings which coexisted simultaneously in them.

The Index of Accident Proneness was constructed upon the basis of findings described above and of theoretical inquiry, and was regarded as a useful scoring method when Rorschach's test would be used as an aptitude test, though not without some limitation. The efficiency ratio of the index was 76.6%, this is a sufficiently gratifying one. The formula of the ratio is, however, applicable only in the case when subjects of both groups are roughly the same in number. Our non-accident group consists of three times as many persons as the accident group. It is wrong, therefore, to applicate the formula to our data. We cannot obtain a substitute formula but we shall perhaps be permitted to define the efficiency ratio as the average of percentages of qualified non-accident driver and of disqualified accident driver. Then the ratio= 63.3%, because according to our classification by the index 89.7% of non-accident drivers are qualified and 36.9% of accident driver are disqualified.

The screening test with this index has its merit in qualifying a large majority of non-accident group for drivers but at the same time it has its weak point in allowing 60% of accident-prone drivers to pass the test. Unless this short-coming is remedied, the use of this scoring system alone as an apptitude test will remain inadequate. It is necessary to try its validity on other subjects in future.

References

(1) Harris, F.J. Can personality tests identify accident prone employees? *Personnel Psychol.*, 1950, 3, 445–459.

(2) Maruyama, K., & Kitamura, S. Speed anticipation test: A test for discrimination of accident proness in motor driver. *Tohoku Psychol. Folia*, 1961–62, XX, 13–19.

(3) Miller, C. A comparison of highaccident and lowaccident bus and street car operators. *J. Proj. Tech.*, 1955, 19, 146–151.

(4) Nagatsuka, Y. & Kitamura, S. Discriminative reaction test of multiple performance type: a test for discrimination of accident proneness in motor driver. *Tohoku*

Psychol. Folia, 1961–1962, XX, 21–34.

(5) Watanabe, K., Kodama, A. & Taga, K. Excellent motor driver and accident motor driver. Paper read at the Annual Meeting of Japan Applied Psychology Ass. in Sendai, Oct. 1956.

(Received August 20, 1964)

Résumé

202 chauffeurs d'autobus et d'automobile ont été essayés au moyen de l'invetaire de personnalité, le test de compléter les phrases de la frustration, la méthode d'administration courte du test de Rorschach et les cartes de mouvement de Levy. Dans ce rapport on n'a pas touché des résultats des deux antérieurs des quatre méthodes.

On a trouvé plus fréquemment qu'il y a eu des réponses de clair-obscur et de couleur significativement dans ceux du groupe accident-fait dans le test de Rorschach et aussi plus des échecs dans la carte du mouvement de Levy. La moyenne arithmétique des valeurs du signe d'inclination à l'accident évaluées selon le critérium qui a été trouvé dans cette étude est 1.57 (mode 0.45) dans le groupe non-accident-fait, 1.76 (mode 1.45) dans le groupe moyen, 2.11 (mode 2.45) dans le groupe accident-fait, et 1.71 dans l'ensemble des subjets. La différence entre le moyen du groupe non-accident-fait et celui du groupe accident-fait a été significative au moyen du test de t. ($p<0.001$).

Quand l' IAP est employé comme le test de l'aptitude pour chaufeur, on peut décider que le subject qui acquiert des points plus que 3.0 soit regardé comme incapable et celui qui acquiert des points moins que 2.9 comme capable. Quand nous avons dichotomisé nos subjects selon ce critérium, nous avons pu vior que les chauffeurs regardés incapables ont été trouvés plus fréquemment dans le groupe accident-fait et les hommes regardés capables plus souvent dans le groupe non-accident-fait, cette tendence a été significative au moyen du test de χ^2 ($p<0.01$).

Nous avouns discuté des mérites et des défauts de cette méthode d'évaluation, et la structure de la personnalité et les traits pyschologiques des chauffeurs inclinés à faire l'accident.